REMARKS

The following remarks are made in response to the Office Action mailed November 29, 2005. Claims 2-47 were rejected. With this Response, claims 2-3, and 25 have been amended. Claims 2-47 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 103

The Examiner rejected claims 2-18, 22, 25-41, and 45 under 35 U.S.C. § 103(a) as being unpatentable over the Request for Comment 793, Transmission Control Protocol (Sept. 1981) (RFC 793) reference and the P.V. Mockapetris, Analysis of Reliable Multicast Algorithms for Local Networks, ACM (1983) reference and the Block et al. U.S. Patent No. 6,192,417.

The Examiner rejected claims 19-21 and 42-44 under 35 U.S.C. § 103(a) as being unpatentable over the RFC 793 reference and the Mockapetris reference and the Block et al. U.S. Patent No. 6,192,417, and further in view of the J.M. Aldrich (USNET post, Oct. 16, 1997) reference.

The Examiner rejected claims 23-24 and 46-47 under 35 U.S.C. § 103(a) as being unpatentable over the RFC 793 reference and the Mockapetris reference and the Block et al. U.S. Patent No. 6,192,417, and further in view of the Request for Comment 2236, Internet Group Management Protocol, Version 2 (Nov. 1997) (RFC 2236) reference.

Amended independent claim 2 includes the limitations that the source endnode participating in the multicast group includes "a network interface controller having a completion processing unit configured to generate a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode."

Amended independent claim 25 includes "generating, with a network interface controller at the source endnode, a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode."

The Examiner admits that neither that RFC 793 reference nor that Mockapetris reference teach or suggest the limitations of amended independent claim 1 of a completion processing unit configured to generate a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode. The Examiner also admits that neither that RFC 793 reference nor that Mockapetris reference teach or suggest the limitations of amended independent claim 25 of generating a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode. The Examiner relies on the Block patent to teach these limitations.

The Block patent discloses a cluster topology servicer 124, a cluster communication servicer 125, and a network message servicer 126 **which are computer programs stored in main memory 120, which can be integrated with the operating system or be provided as add on applications to operating systems**. Cluster topology servicer 124 provides the functionality needed to set up and implement one or more multicast groups in a cluster. The cluster communication servicer 125 acts as both a sender of messages to other nodes (including multicast messages to predefined groups), and a receiver of messages from other nodes. The a network message servicer 126 comprises a protocol suite for sending and receiving multicast and point to point messages as directed by cluster communication servicer 125.

Thus, the Block patent does not teach or suggest the limitations of amended independent claim 1 of the source endnode participating in the multicast group including "a network interface controller having a completion processing unit configured to generate a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the multicast group have reliably received a selected amount of message data multicast from the source endnode." The Block patent also does not teach or suggest the limitations of amended independent claim 25 of "generating, with a network interface controller at the source endnode, a completion event to the source process in response to an indication that a predetermined percentage of destination endnodes in the

multicast group have reliably received a selected amount of message data multicast from the source endnode."

In addition, the RFC 793 reference does not teach or suggest the limitations in amended independent claim 2 of multiple end-to-end contexts, each end-to-end context having a portion storing state information at the source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes, wherein a reliable multicast comprises a series of replicated unicasts of message data through the send work queue and each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portion of each of the destination endnodes.

The RFC 793 reference also does not teach or suggest the method of amended independent claim 25 of multicasting in a distributed computer system including a source endnode participating in a multicast group and multiple destination endnodes participating in the multicast group including storing in each of multiple end-to-end contexts state information at the source node and state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes, and reliably multicasting data including performing a series of replicated unicasts of message data to the send work queue and each of portions of the end-to-end contexts at the source endnode to the receive work queue and corresponding end-to-end context portions of each of the destination endnodes.

As admitted by the Examiner, the RFC 793 reference fails to disclose a reliable multicast to a group of destination endnodes wherein the reliable multicast comprises a series of replicated unicasts to each endnode.

In addition, the RFC 793 reference teaches the transmission control protocol (TCP) which employs a reliable connection service between two processes. A similar reliable connection service to communicate between distributed processes is illustrated in Figure 3 and described from page 12, line 20-page 14, line 9 of the Present Specification. The TCP reliable connection service and the reliable connection service described and illustrated in the Present Specification both require an association of a local send buffer or queue and receive buffer or queue (i.e., queue pair (QP)) with one and only one remote QP. In a reliable

connection service a non-sharable resource connection must be established between a source process and a destination process. The connection establishment and clearing of the TCP reliable connection service is described in Section 2.7, beginning at page 10 of the RFC 793 reference, which states that a connection is fully specified by the pair of sockets at the ends, and the connection can be used to carry data in both directions, that is, it is full duplex.

A reliable connection service, such as disclosed in the RFC 793 reference and disclosed in the Present Specification, requires a process to create a QP for each process which it is to communicate with over a network.

By contrast, the distributed computer system of amended independent claim 2 and the method of multicasting in a distributed computer system of amended independent claim 25 employ multiple end-to-end contexts, each having a portion storing state information at the source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes, wherein a reliable multicast comprises a series of replicated unicasts of message data through the send work queue and each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portions at each of the destination endnodes. Embodiments of reliable multi-unicast services are described in detail beginning at page 33, line 12 and correspondingly illustrated in Figures 13-15 of the Present Specification.

The end-to-end contexts at the source endnode and the destination endnodes as recited in amended independent claims 2 and 25 permit mupltiple reliable unicast services, such as reliable datagram services, to be established between the source process and the destination processes. The established reliable unicast services, such as reliable datagram services, are effectively connectionless as a result of the end-to-end contexts at the source endnode and the destination endnodes, which can greatly improve scalability.

Moreover, the Mockapetris reference does not teach or suggest the limitations of amended independent claim 2 of a reliable multicast comprising a series of replicated unicasts of message data through the send work queue and each of the end-to-end context portions at the source endnode to the receive work queue and the corresponding end-to-end context portion at each of the destination endnodes.

The Mockapetris reference also does not teach or suggest the limitations of amended independent claim 25 of reliably multicasting data including performing a series of replicated unicasts of message data through the send work queue and each of portions of the end-to-end contexts at the source endnode to the receive work queue and corresponding end-to-end context portions at each of the destination endnodes.

By contrast, the Mockapetris reference teaches simulation of a multicast in a local network which lacks any sort of one-to-many transmission capability. In the Mockapetris reference, the sender merely transmits separate messages to each destination and receives separate acknowledgements in return. Each destination requires two transmissions, so that a multicast set of N destinations require 2 N transmissions. Each transmission is created and received by a host, so a grand total of 4 N packets are processed by all hosts. As stated in the Mockapetris reference at page 153, column 2, this simulated multicast is "usually the most expensive."

Thus, the Mockapetris simulated multicast is a straightforward way for a local network which lacks any sort of one-to-many transmission capabilities to simulate a multicast, but the method is "usually the most expensive" to implement.

By contrast, the distributed computer system of amended independent claim 2 and the method of multicasting in a distributed computer system of amended independent claim 25 employ multiple end-to-end contexts, each end-to-end context having a portion storing state information at the source node and a portion storing state information at a corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes to ensure the reception and sequencing of message data multicast from the source endnode to the corresponding one of the destination endnodes to provide a reliable multicast which has one-to-many transmission capability (i.e., not just a simulated expensive multicast as taught in the Mockapetris reference) which comprises a series of replicated unicasts of message data through the send work queue and each of the end-to-end contexts portions of the source endnode to the receive work queue and the corresponding end-to-end context portion at each of the destination endnodes.

Therefore, the RFC 793 reference, the Mockapetris reference, and the Block patent do not teach or suggest alone or in combination all of the limitations of the distributed computer

system of amended independent claim 2 or all of the limitations of the method of amended independent claim 25. In addition, dependent claims 3-24 further define patentably distinct amended independent claim 2, and dependent claims 26-47 further define patentably distinct amended independent claim 25. Therefore, dependent claims 3-24 and 26-47 are also believed to be allowable.

Therefore, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 103 rejection to claims 2-47, and request allowance of these claims.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 2-47 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 2-47 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to either Patrick G. Billig at Telephone No. (612) 573-2003, Facsimile No. (612) 573-2005 or Kevin Hart at Telephone No. (970) 898-7057, Facsimile No. (970) 898-7247. In addition, all correspondence should continue to be directed to the following address:

Hewlett-Packard Company
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

Respectfully submitted,

Michael R. Krause et al.,

By their attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-2003
Facsimile: (612) 573-2005

Date: 2-28-06

PGB:cmj:mlm

Patrick G. Billig
Reg. No. 38,080

CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being transmitted via facsimile to Facsimile No. (571) 273-8300 on this 28 day of February, 2006.

By: _____
Name: Patrick G. Billig